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The Effect of Institutional Investors on Capital Structure in Industry-Leading Firms, with Emphasis on Initial Public Offerings (IPOs)

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Abstract

The purpose of this study is to examine the effect of institutional investors on capital structure and the moderating role of Initial Public Offerings (IPOs). To this end, three research hypotheses were developed and tested using data from 336 firm-year observations pertaining to companies listed on the Tehran Stock Exchange (TSE) over the period 2018–2024. The main research variables include institutional investors, capital structure, and IPOs as the moderating variable. To analyze the data and test the hypotheses, panel-data-based statistical and econometric methods were employed using Stata version 17 at a 95% confidence level. The results of the hypothesis tests indicate that institutional investors have a positive and statistically significant effect on firms' capital structure. Furthermore, the findings show that, among industry-leading firms, institutional investors have a positive and significant effect on capital structure. In addition, the results indicate that under IPO conditions, the moderating effect on the aforementioned relationships remains positive and statistically significant. Overall, the findings suggest that the active participation of institutional investors, particularly in the context of IPOs, can play an important role in improving firms' financing decisions and enhancing investment efficiency. Based on the findings, it is recommended that corporate managers strengthen the role of institutional investors and pay particular attention to firms' financial conditions to facilitate improvements in capital structure and the optimal allocation of resources. Future studies are also encouraged to examine other governance and institutional factors affecting capital structure and investment efficiency across different industries and time periods.

Keywords: Institutional investors, Capital structure, Initial public offering, Industry-leading firms.

1 | Introduction

In recent years, the growing role of institutional investors in capital markets has drawn the attention of researchers and policymakers to the influence of these investors on firms' financial decisions. Institutional investors include investment funds, insurance companies, banks, and other professional financial institutions

that, owing to their substantial financial resources, analytical expertise, and strong monitoring capabilities, can play an important role in mitigating agency problems and enhancing corporate governance [1]. One of the key areas affected by the presence of institutional investors is firms' capital structure. Capital structure represents the mix of debt and equity used to finance a firm and, as one of management's strategic decisions, has a direct impact on the cost of capital, financial risk, and firm value. According to financial theories, including agency theory and static trade-off theory, ownership structure, particularly the presence of institutional investors, can influence firms' capital structure choices by strengthening managerial oversight, reducing opportunistic behavior, and exerting pressure on managers to make optimal financing decisions [2].

Among these firms, industry-leading firms hold a distinctive position in capital markets due to their larger market shares, more stable performance, better access to financial resources, and greater credibility among investors. These firms typically serve as benchmarks for other companies within the industry, and their financial policies, including financing policies and capital structure decisions, can have far-reaching implications for the industry as a whole [3]. Accordingly, examining the factors affecting capital structure in industry-leading firms assumes even greater importance.

In addition, an Initial Public Offering (IPO) is one of the most significant financial events in a firm's life cycle, resulting in fundamental changes in ownership structure, the level of information transparency, and the composition of investors. Prior research indicates that institutional investor participation tends to increase following an IPO, which can have a significant impact on firms' financial policies and capital structure [4]. Particularly in industry-leading firms, an IPO may further enhance the role of institutional investors in shaping financing decisions.

In light of the foregoing, examining the effect of institutional investors on capital structure in industry-leading firms, with particular emphasis on IPOs, can provide deeper insights into the interaction among ownership structure, major capital-market events, and firms' financing decisions. Beyond contributing to the existing financial literature, the findings of this study may have important practical and policy implications for corporate managers, institutional investors, financial analysts, and capital-market regulatory authorities, particularly in emerging markets.

2 | Statement of the Problem

The literature on IPOs indicates that institutional investors play several beneficial roles in IPOs. Considerable evidence highlights the importance of institutional investors in IPO pricing. Rock [5] finds that allocating shares to institutional investors mitigates the adverse-selection problem faced by retail investors and ensures that retail investors are not driven out of the IPO market. Benveniste and Spindt [6] propose that institutional investors contribute value-relevant information to the pricing of IPOs. Similarly, Agarwal et al. [7] provide empirical evidence that institutional allocations to underwriters assist in extracting favorable pre-market demand information for adjusting the offer price. Consistent with this perspective, Chemmanur [8] finds that these informed investors help bring the market value of a firm's shares closer to their intrinsic value through their post-IPO trading activities. The allocation of a large block of shares to institutional investors may benefit retail investors by serving as a signal of share quality and reducing information asymmetry. Accordingly, allocating shares to institutional investors provides informational benefits to both issuing firms and retail investors. When institutional ownership is high, institutional investors have greater incentives to monitor corporate performance. Consequently, IPOs supported by institutional investors may exhibit better long-term performance. Field and Lowry [9] show that institutional ownership may have predictive power for risk-adjusted long-term performance.

Boomer et al. [10] demonstrate that institutional investors receive larger allocations in IPOs with better long-term performance. Over the past two decades, regulators in emerging markets such as India and China have introduced numerous reforms to ensure the smooth and efficient functioning of stock markets. For example, the China Securities Regulatory Commission has revised IPO approval procedures and imposed stricter restrictions on IPO offer prices [11]. The stock exchange authorities have also initiated reforms to improve

market access for small and young firms and to reduce the level and volatility of IPO underpricing. The 2007–2008 global financial crisis substantially eroded investors' wealth. This crisis prompted regulators to introduce investor-support schemes to restore investor confidence. We examine whether such investor-support schemes resulted in a significant increase in IPO activity following the crisis. We also exploit regulatory reforms to investigate whether investment by institutional investors reduces the cost of equity issuance. This enhanced ability to raise capital may enable institutionally supported firms to undertake more profitable investments while also reducing financial leverage. We test these hypotheses; 1) Gustafson and Iliev [12] examine the consequences of an exogenous deregulation in 2008 that allowed smaller firms with publicly held shares of less than \$75 million to raise capital through seasoned equity offerings under the U.S. shelf-registration process. They document reductions in equity issuance costs, increases in investment, and decreases in financial leverage. In contrast, we employ the aforementioned setting to investigate how institutional investors can help IPO firms achieve similar outcomes in an emerging-market context. Young and small firms facing information asymmetry may find it beneficial to establish relationships with lead investors as a means of signaling the quality and credibility of their firms, 2) prior research has examined the effects of the Jumpstart Our Business Startups (JOBS) Act, which was enacted to revitalize the IPO market for small firms in the United States. Dambra et al. [13] find that, after controlling for market conditions, the JOBS Act resulted in a 25% increase in IPO volume relative to pre-Act levels, with firms characterized by high proprietary disclosure costs, such as biotechnology and pharmaceutical companies, exhibiting the largest increase in activity. Similar to these studies, we examine the consequences of regulatory reform. We extend the literature by investigating the role of lead institutional investors in improving market access for young firms. We posit that institutional investors confer credibility on IPO firms, thereby enabling a greater number of firms to go public. We hypothesize that, after controlling for market conditions, the selection of lead institutional investors increases IPO volume and that IPOs backed by lead institutional investors generate greater increases in equity value after controlling for firm characteristics, particularly when firms face financial constraints, and 3) one potential benefit of an institutional investor-support scheme is that it reduces the allocation risk borne by underwriters. The underwriting risk-reduction hypothesis suggests that by pre-selling a large portion of the shares to institutional investors, underwriters can avoid the risk of being left with unsold shares. Because this process reduces underwriting risk, we expect underwriting fees to decline when institutional investors participate. This effect may be particularly pronounced when well-known institutional investors are involved. We therefore hypothesize that institutional investor support reduces underwriting costs, particularly when reputable institutional investors participate. Prior research indicates that IPOs backed by institutional investors exhibit lower levels of underpricing than IPOs without institutional investor backing [14], [15]. Capital structure is one of the most important financial decisions facing firms, as it affects firm value, risk, and financing capacity. In recent years, the role of institutional investors as a determinant of corporate financial decisions, particularly during IPOs, has received increasing attention. By virtue of their financial resources, analytical capabilities, and monitoring role, these investors can reduce information asymmetry and enhance the confidence of other investors.

Industry-leading firms, owing to their competitive position and substantial market share, play an important role in shaping industry developments, and their financial decisions may also influence other firms within the industry. Nevertheless, sufficient evidence remains lacking regarding the effect of institutional investor participation on the capital structure of these firms, particularly during and following an IPO.

Accordingly, the central issue addressed in this study is to examine the effect of institutional investors on capital structure in industry-leading firms, with particular emphasis on IPOs, in order to determine how the presence of these investors may affect the mix of debt and equity and the financing decisions of such firms.

3 | Literature Review and Theoretical Foundations

In real-world markets characterized by information asymmetry and agency problems, firms' capital structures are not determined solely by considerations of the cost of capital but are also strongly influenced by corporate governance mechanisms. Owing to their substantial ownership stakes, financial expertise, and ability to

exercise active oversight, institutional investors are regarded as one of the key pillars of the corporate governance system. By effectively monitoring managers' financing decisions, these investors can prevent excessive reliance on debt or overdependence on internal financing. Recent studies indicate that the presence of institutional investors reduces managerial opportunistic behavior and encourages firms to move toward an optimal capital structure. Particularly in large and industry-leading firms, institutional investors play a decisive role in determining the debt-to-equity ratio [16].

Accordingly, institutional investors are expected to have a significant effect on firms' capital structure. Investment efficiency reflects a firm's ability to optimally allocate resources to projects with positive net present value. Under conditions of information asymmetry, managers may engage in overinvestment, particularly in firms with high cash flows, or underinvestment, particularly in financially constrained firms. Through professional analysis of information and continuous monitoring, institutional investors can mitigate such inefficiencies. Recent empirical evidence indicates that firms with higher levels of institutional ownership make more efficient investment decisions and exhibit smaller deviations from their optimal level of investment [17]. Therefore, institutional investors are expected to have a significant positive effect on firms' investment efficiency. Financial constraint refers to a firm's inability to access external sources of financing at a reasonable cost. Under such conditions, capital structure decisions become increasingly influenced by the firm's creditworthiness and investors' confidence. Institutional investors can reduce the financing costs of financially constrained firms by serving a certification role. Recent studies indicate that, in firms facing high levels of financial constraints, the effect of institutional investors on reducing financial risk and adjusting debt levels is considerably stronger [18]. Accordingly, financial constraints are expected to significantly moderate the relationship between institutional investors and firms' capital structure. In financially constrained firms, every investment decision is critically important, and any misallocation of resources can have severe consequences for firm performance and survival. Under such circumstances, institutional investor monitoring can play a key role in preventing inefficient investments. Conversely, in firms without financial constraints, the monitoring effect of institutional investors may be weaker. Empirical evidence since 2020 suggests that the positive effect of institutional ownership on investment efficiency is substantially stronger among financially constrained firms [17], [19].

Therefore, financial constraints are expected to moderate the relationship between institutional investors and investment efficiency. IPOs are generally associated with high levels of information asymmetry and financial constraints. At this stage, institutional investors perform signaling and certification functions and can shape firms' financing decisions in the post-IPO period. Firms facing greater financial constraints at the time of an IPO are more dependent on institutional investor support than other firms. Ritter [20], [21] shows that the composition of institutional ownership at the time of an IPO has long-term effects on firms' capital structures. Accordingly, under IPO conditions, financial constraints are expected to have a significant moderating effect on the relationship between institutional investors and capital structure. Following an IPO, firms gain access to substantial financial resources, and the manner in which these resources are allocated plays a decisive role in determining long-term corporate success. At this stage, financial constraints may lead to hasty or inefficient investment decisions. Through active monitoring, extensive experience, and a long-term investment horizon, institutional investors can improve firms' investment efficiency during the post-IPO period. Recent studies indicate that IPO firms with a strong presence of institutional investors, particularly under conditions of financial constraints, exhibit higher investment efficiency [22]. Therefore, under IPO conditions, financial constraints are expected to significantly moderate the relationship between institutional investors and investment efficiency.

Neupane et al. [23] specifically examined firms newly listed on the stock exchange and found that the presence of institutional investors in the initial ownership structure plays an important role in enhancing firms' credibility in the market, reducing information asymmetry, and improving the quality of financing decisions. The study emphasizes that industry-leading firms derive greater benefits from these advantages than other firms at the time of their IPO.

Moradi et al. [24], in a study entitled “The effect of institutional investors on the capital structure of Iranian listed firms,” found that institutional investors have a significant effect on the capital structure decisions of firms listed on the Iranian stock exchange. Their findings indicate that the presence of institutional investors, owing to their monitoring capabilities, encourages firms to move toward a more optimal capital structure.

Chaganti and Damanpour [25], focusing on large industrial firms, concluded that institutional investors influence decisions regarding the mix of debt and equity through active monitoring of management. Their findings further indicate that, in firms with substantial influence within their respective industries, institutional ownership is associated with a more conservative capital structure and lower financial risk.

Chung and Wang [26] examined the effect of institutional investors on capital structure decisions at the time of IPOs. Their findings showed that IPO firms with greater institutional investor participation perform better than other firms in achieving an optimal mix of debt and equity. The findings further suggest that institutional investors can assist firms in selecting an appropriate financial structure.

In another study, Michel et al. [27] examined the role of institutional investors in maintaining capital structure stability following an IPO. Their findings indicate that firms supported by institutional investors at the time of their IPO experienced lower fluctuations in debt ratios and followed a more stable financing path in the years after the IPO. This effect was found to be more pronounced among industry-leading firms.

Rubin [28] investigated the effect of shareholder structure on stock liquidity, with an emphasis on the role of financial constraints, among firms listed on the Tehran Stock Exchange (TSE). Their results indicate that financial constraints have a significant nonlinear (U-shaped) effect on the relationship between individual ownership and firms’ bid–ask spreads, and a significant inverse U-shaped effect on the relationship between free-float ownership and firms’ bid–ask spreads. However, financial constraints do not have a significant moderating effect on the relationship between institutional ownership and firms’ bid–ask spreads.

Agyei [29] examined the relationship between institutional investors and capital structure in firms with high free-float ownership. The results showed that institutional investors encourage firms to use higher levels of debt, which was attributed to the confidence arising from the financial support provided by these investors.

Margaritis and Psillaki [30], in a study entitled “The effect of institutional investors on capital structure in firms operating across different industries,” examined the influence of institutional investors across various industries. The findings indicated that, in low-risk industries, institutional investors show a greater preference for equity financing, whereas greater reliance on debt financing is observed in higher-risk industries.

Chang et al. [31], in a study of firms listed on the TSE, found that higher institutional ownership is associated with lower agency costs and improved capital structure decisions. Their results indicate that the presence of institutional investors facilitates more efficient use of financial leverage, particularly among large firms with high market values.

Hafshejani et al. [32] examined the effect of institutional investor participation in the IPO process on firms’ capital structure. The results showed that firms with institutional investor participation, particularly during the IPO stage, exhibit more optimal capital structures, which contributes to reducing equity issuance costs and attracting investors.

Ashrafi [33] investigated the effect of institutional investors on capital structure decisions in large Iranian listed firms. The findings indicated that firms with a higher proportion of shares held by institutional investors have a more favorable mix of debt and equity, which is attributed to the monitoring and strategic influence of these investors.

Alipour et al. [34], in a study entitled “The effect of institutional investors on capital structure in large and industry-leading firms,” examined the influence of institutional investors in industry-leading firms. The results showed that these firms, through the presence of institutional investors in their ownership structure, were able to gain greater access to financial resources and establish a more optimal financial structure.

Sharma et al. [35] examined the effect of institutional investors on capital structure in IPO firms. The findings indicated that, during the IPO process, firms receiving greater support from institutional investors achieved a more optimal capital structure, which increased investor confidence in these firms.

Ghahroudi et al. [36] focused on the effect of institutional investor participation on the capital structure of industrial firms listed on the TSE. The findings showed that institutional investors encourage firms to adopt less risky capital structures and demonstrate a greater preference for equity financing.

Ashrafi [33] examined the effect of institutional investors on capital structure decisions in non-financial firms listed on the TSE. The findings indicated that institutional investors tend to favor debt financing in firms characterized by lower risk and greater financial stability.

Namazi and Kermani [37] examined the relationship between institutional shareholders and information symmetry in the TSE. The findings indicate that, compared with firms with lower levels of institutional ownership, firms with higher institutional ownership have stock prices that incorporate more information about future earnings. This finding was attributed to the professionalism of institutional shareholders and their relative advantage and ability in processing information.

Sharma et al. [35] examined the effects of institutional investors on capital structure in IPO firms. The results indicate that IPO firms with greater institutional investor participation have more optimal capital structures, and this effect is particularly evident in the post-IPO period.

Huo et al. [38] investigated the effect of institutional investors on the capital structure of Chinese IPO firms. Their findings show that the presence of institutional investors improves firms' capital structures, enabling them to achieve a more optimal mix of debt and equity.

Choi et al. [39] demonstrated that institutional investors play an important role in influencing capital structure decisions in IPO firms. Particularly in large and industry-leading firms, institutional investors reduce firms' reliance on debt and increase financing through equity.

Lu and Samdani [14] examined the effect of institutional investors on firms' investment policies and capital structure at the time of an IPO. The results indicate that IPO firms receiving greater support from institutional investors achieve a more balanced capital structure, with this effect being particularly pronounced during periods of financial distress.

Field and Lowry [9] showed that firms receiving institutional investor support during the IPO stage tend to select a more optimal financial structure. Institutional investors exert substantial influence on firms' strategic and financial decision-making processes during this stage.

Cline et al. [40] examined the relationship between ownership structure and capital structure in IPO firms. The findings indicate that firms with greater institutional ownership rely more heavily on debt financing, suggesting that institutional ownership has a significant effect on their capital structure.

Chung et al. [41] investigated the effect of institutional investors on the capital structure of IPO firms in South Korea. The results indicate that institutional investors play an important role in selecting a more optimal financial structure and lead these firms to rely relatively more heavily on debt financing.

Huo et al. [38] examined the effect of institutional investors on changes in capital structure following an IPO. The findings indicate that institutional investors support IPO firms in reducing their reliance on debt and increasing their reliance on equity financing.

Wang and Luo [42] investigated the effects of institutional investors on financing policies and capital structure in IPO firms. The results indicate that institutional investors, particularly in high-performing and industry-leading firms, can influence the selection of an optimal mix of debt and equity.

Sharma et al. [35] examined the relationship between capital structure and the characteristics of institutional investors in IPO firms. The findings indicate that institutional investors play an important role in influencing

capital structure during the IPO process, with their effect being particularly pronounced in industry-leading firms.

4 | Research Hypotheses

Based on the foregoing discussion, the following hypotheses are formulated:

- Hypothesis 1.** Institutional investors have a significant effect on firms’ capital structure.
- Hypothesis 2.** In industry-leading firms, institutional investors have a significant effect on firms’ capital structure.
- Hypothesis 3.** Under IPO conditions, institutional investors do not have a significant effect on the capital structure of industry-leading firms.

5 | Methodology

The present study is applied in terms of its purpose and was conducted using a quasi-experimental design and a descriptive-correlational approach. The research method is causal or ex post facto, meaning that data were collected and analyzed based on firms’ past and historical information, particularly the financial statements of companies listed on the TSE. The study is also a library-based research project, relying on documentary and historical records, online resources, and reputable databases. In addition, it employs an analytical-causal approach based on panel-data analysis.

6 | Statistical Population, Sample, and Sampling Method

The statistical population of this study comprises all firms listed on the TSE. The statistical sample consists of a limited number of units selected from the statistical population that adequately represent its principal characteristics. To ensure that the sample provides an appropriate representation of the target population, a systematic elimination (screening) sampling method was employed. Accordingly, five criteria were established, and firms that satisfied all of these criteria were included in the research sample, while the remaining firms were excluded. The sample selection process is presented in *Table 1*.

Table 1. Number of sample firms.

Description	Number of Firms
Total number of firms listed on the TSE at the end of 2024	603
Selection Criteria	
Firms that were not actively listed on the stock exchange during the 2018–2024 study period	(217)
Firms classified as holding companies, investment companies, financial intermediaries, banks, or leasing companies	(15)
Firms whose fiscal year did not end on March 20 or that changed their fiscal year during the study period	(18)
Firms that experienced a trading suspension of more than six months during the study period	(17)
Firms for which the required information was unavailable during the study period	—
Final sample firms	336

After applying all of the aforementioned criteria, 336 firms remained in the screened population, all of which were selected as the final research sample. The observations cover the period from 2018 to 2024.

7 | Data Collection Instruments

The required research data were collected using library-based methods and documentary sources. First, preliminary studies and the theoretical framework of the research were developed based on library resources, including books, journals, theses, academic articles, and online sources. Subsequently, the data required to test the research hypotheses were collected from the databases of the TSE, the website of the research,

development and Islamic studies department of the Securities And Exchange Organization at Rdis¹, and specialized data platforms and software packages, including Rahavard Novin and Tadbir Pardaz.

The data collection instrument for the theoretical foundations was a note-taking and reference-card system, while researcher-developed data sheets were used to collect the information required for the empirical model. Following the collection of quantitative data for hypothesis testing, the data were classified and organized using Microsoft Excel and subsequently analyzed using Stata.

7.1 | Scope of the Research

Thematic scope of the research: the thematic scope of this study is to examine the effect of institutional investors on capital structure in industry-leading firms, with particular emphasis on init IPOs.

Geographical scope of the research: the geographical scope of the study comprises firms listed on the TSE.

Temporal scope of the research: the study covers a continuous seven-year period from 2018 to 2024.

7.2 | Research Model and Measurement of Variables

The following models are employed to test the research hypotheses.

$$\text{Lev}_{it} = \beta_0 + \beta_1 \text{InstOwn}_{it} + \beta_2 \text{Size}_{it} + \beta_3 \text{IND}_{it} + \beta_4 \text{Age}_{it} + \beta_5 \text{FC}_{it} + \varepsilon \quad (1)$$

$$\text{Lev}_{it} = \beta_0 + \beta_1 \text{InstOwn}_{it} + \beta_2 \text{Liad}_{it} + \beta_3 (\text{InstOwn} * \text{Liad})_{it} + \beta_4 \text{Size}_{it} + \beta_5 \text{IND}_{it} + \beta_6 \text{Age}_{it} + \beta_6 \text{FC}_{it} + \varepsilon \quad (2)$$

$$\text{Lev}_{it} = \beta_0 + \beta_1 \text{InstOwn}_{it} + \beta_2 \text{Liad}_{it} + \beta_3 \text{IPO}_{it} + \beta_4 (\text{InstOwn} * \text{Liad})_{it} + \beta_5 (\text{InstOwn} * \text{IPO})_{it} + \beta_6 (\text{InstOwn} * \text{Liad} * \text{IPO})_{it} + \beta_7 \text{Size}_{it} + \beta_8 \text{IND}_{it} + \beta_9 \text{Age}_{it} + \beta_{10} \text{FC}_{it} + \varepsilon \quad (3)$$

Dependent variable: Capital structure, LEV: calculated as the ratio of total debt to total assets.

Independent variable: Institutional investors, InstOwn: the percentage of shares held by institutional investors or shareholders who own more than 5% of the firm's shares.

Moderating variables:

- I. IPO: A dummy variable that takes the value of 1 for firms offering their shares to the public for the first time and 0 otherwise.
- II. Industry Leadership (Liad): This variable is measured by classifying firms according to their age relative to the average age of firms operating within the same peer industry. Firms are first classified by industry, and the average firm age is then calculated separately for each industry and year. Firms whose age is below the average age of all firms operating in the corresponding peer industry in a given year are classified as young firms within the industry and assigned a value of 1, whereas all other firms are assigned a value of 0.

Control variables:

- I. Firm size (Size): The natural logarithm of total firm assets.
- II. Board independence (Ind): Measured as the ratio of non-executive board members to the total number of board members.
- III. Financial constraints (FC): A dummy variable that takes the value of 1 for firms experiencing financial constraints and 0 otherwise.
- IV. Firm age (Age): The natural logarithm of the number of years since the firm was listed on the stock exchange.

¹ www.rdis.ir

8 | Statistical Findings

Table 2 presents the descriptive statistics for the variables included in the research model. These statistics provide a separate summary of the descriptive characteristics of each variable. They primarily include measures of central tendency, such as the maximum, minimum, and mean, as well as measures of dispersion, such as variance.

Table 2. Descriptive statistics.

Variable	Symbol	Mean	Standard Deviation	Median	Minimum	Maximum	Skewness	Kurtosis
Capital structure	Lev	0.460	0.195	0.459	0.035	0.946	0.014	2.501
Institutional investors	InstOwn	0.754	0.139	0.760	0.113	0.959	-1.572	6.900
Firm size	Size	16.668	1.571	16.521	13.138	20.761	0.241	2.627
Board independence	IND	0.704	0.157	0.800	0.200	1.000	-0.369	3.536
Firm age	Age	3.062	0.513	3.091	1.386	4.248	-0.062	3.113

Among the most important measures of central tendency is the mean, which represents the equilibrium point and center of gravity of a distribution and provides an appropriate measure of the central location of the data. The mean value of the board independence variable is 0.704, indicating that most observations for this variable are concentrated around this value.

Measures of dispersion generally indicate the extent to which observations vary from one another or deviate from the mean. One of the most important measures of dispersion is the standard deviation. The standard deviation is 1.571 for the firm size variable and 0.116 for investment efficiency.

The median is the value that divides a statistical population or probability distribution into two equal parts. The median value of board independence is 0.800, indicating that the board independence ratio is above 80% for half of the firms and below 80% for the other half.

Skewness is a measure of the degree of symmetry of a probability distribution. For a perfectly symmetric distribution, skewness is zero. A positively skewed distribution is asymmetric with a longer tail toward higher values, whereas a negatively skewed distribution is asymmetric with a longer tail toward lower values. As shown in the table, some variables, such as firm age, exhibit negative (left) skewness, whereas others, such as capital structure, exhibit positive (right) skewness.

Kurtosis indicates the peakedness of a distribution. In other words, it measures the height of the distribution curve at its maximum point. The kurtosis of a normal distribution is 3. Positive kurtosis indicates that the peak of the distribution is higher than that of a normal distribution, whereas negative kurtosis indicates a lower peak. Among the variables, institutional ownership has the highest kurtosis, with a value of 6.900.

Table 3. Frequency distribution of the financial constraints variable.

Description	Frequency	Frequency (%)
Firms without financial constraints	202	60.12
Firms with financial constraints	134	39.88
Total	336	100.00

As shown in Table 3, the total number of firm-year observations examined is 336, of which 134 firm-year observations, representing 39.88% of the sample, are classified as financially constrained.

Table 4. Frequency distribution of the IPO variable.

Description	Frequency	Frequency (%)
Firms that did not conduct an IPO	254	75.60
Firms that conducted an IPO for the first time	82	24.40
Total	336	100.00

As shown in *Table 4*, the total number of firm-year observations examined is 336, of which 82 firm-year observations, representing 24.40% of the sample, correspond to firms that conducted an IPO for the first time.

Table 5. Frequency distribution of the industry-leading firms variable.

Description	Frequency	Frequency (%)
Firms that were not industry leaders	169	50.30
Firms that were industry leaders	167	49.70
Total	336	100.00

As shown in *Table 5*, the total number of firm-year observations examined is 336, of which 167 firm-year observations, representing 49.70% of the sample, correspond to industry-leading firms.

8.1| F-Limer (Chow) and Hausman Tests

Table 6. Results of the F-Limer (Chow) and Hausman tests.

Model	Test	Test Statistic	p-value	Result
First	F-Limer (Chow)	9.78	0.000	Panel data method
	Hausman	20.55	0.001	Fixed effects
Second	F-Limer (Chow)	9.66	0.000	Panel data method
	Hausman	35.79	0.000	Fixed effects
Third	F-Limer (Chow)	9.43	0.000	Panel data method
	Hausman	31.67	0.000	Fixed effects

As reflected in *Table 6*, the p-values of the F-Limer (Chow) test for all research models are below 5%. Therefore, the panel-data method is employed to estimate all models. Furthermore, since the p-values of the Hausman test for all research models are below 5%, the fixed-effects model is used for estimating these models.

8.2| Testing the Assumptions of the Linear Regression Model

A set of assumptions, commonly referred to as the classical assumptions, concerns the disturbance term (or error term) of the model. For the regression coefficient estimators in a linear regression model to be the Best Linear Unbiased Estimators (BLUE), the underlying assumptions of the model must be examined and tested. Accordingly, the procedures used to test these assumptions are presented below, followed by a discussion of the results obtained from the estimation procedures.

8.3| Homoscedasticity of the Error Term

Table 7. Results of the test for Homoscedasticity of the error term.

Model	Test Statistic	p-value	Result
First	5.79	0.016	Heteroscedasticity of the error term
Second	7.09	0.007	Heteroscedasticity of the error term
Third	5.90	0.015	Heteroscedasticity of the error term

The results presented in *Table 7* indicate that the significance level of the test is below 5% for all research models, demonstrating the presence of heteroscedasticity in the error terms. This issue was addressed in the final estimation of the models by applying the Generalized Least Squares (GLS) procedure.

8.4| Absence of Autocorrelation in the Error Term

One of the fundamental assumptions underlying the estimation of regression models using the OLS method is the absence of autocorrelation, or serial correlation, among the error terms. Since the values taken by the

explanatory variables in the model are assumed to be random, the error terms should likewise be random. In other words, there should be no systematic correlation or ordering among the error terms, and their values should not change systematically over time. If such a pattern exists, variations in the error terms are no longer random and may be related to the values of the explanatory variables. Correlation among error terms may occur either across different years or across different cross-sectional units.

The statistical and research hypotheses for this test are as follows:

- I. Null hypothesis (H_0): There is no autocorrelation.
- II. Alternative hypothesis (H_1): Autocorrelation exists.

Table 8. Results of the test for the absence of autocorrelation in the error term.

Model	Test Statistic	p-value	Result
First	163.989	0.000	Presence of autocorrelation in the error term
Second	157.817	0.000	Presence of autocorrelation in the error term
Third	157.169	0.000	Presence of autocorrelation in the error term

Based on the results presented in *Table 8*, the significance level of the test is below 5% for all research models, indicating the presence of serial autocorrelation in the models. This issue was addressed in the final estimation of the models by applying the autocorrelation correction procedure.

8.5 | Results of Testing Hypothesis 1

Table 9. Results of testing hypothesis 1.

Dependent Variable: Firm Capital Structure						
Variable	Symbol	Estimated Coefficient	Standard Error	z-Statistic	p-value	Collinearity
Institutional investors	InstOwn	0.228	0.083	2.73	0.007	1.04
Firm size	Size	0.019	0.009	2.09	0.037	1.08
Board independence	IND	-0.005	0.058	-0.10	0.923	1.04
Firm age	Age	0.052	0.035	1.51	0.133	1.01
Financial constraints	FC	0.077	0.019	4.05	0.000	1.02
Constant	C	-0.228	0.198	-1.15	0.251	—
F-statistic		6.47				
Prob. (F-statistic)		0.0000				
R-squared		0.1445				

To test this hypothesis, the estimation results of the model presented in *Table 9* were used. The results indicate that the p-value (or significance level) of the F-statistic is 0.0000. Since this value is below 0.05, the null hypothesis is rejected at the 95% confidence level, indicating that the model is statistically significant. The coefficient of determination (R^2) indicates that approximately 14% of the variation in the dependent variable is explained by the independent and control variables included in the model. The control variables of firm size and financial constraints have positive coefficients and significance levels below 5%; therefore, they have a positive and statistically significant relationship with the dependent variable. The Variance Inflation Factor (VIF) values are all below 10, indicating the absence of multicollinearity.

Overall, the results show that the coefficient of the institutional investors variable is 0.228, with a significance level of 0.007, which is below the 5% threshold. This coefficient is therefore statistically significant and indicates that institutional investors have a positive and significant effect on firms' capital structure. Accordingly, at the 95% confidence level, the first research hypothesis is supported.

8.6 | Results of Testing Hypothesis 2

Table 10. Results of testing hypothesis 2.

Dependent Variable: Firm Capital Structure						
Variable	Symbol	Estimated Coefficient	Standard Error	z-Statistic	p-value	Collinearity
Institutional investors	InstOwn	0.237	0.071	3.31	0.001	1.08
Industry-leading firms	Liad	0.011	0.030	0.39	0.696	2.72
Institutional investors × industry-leading firms	InstOwn × Liad	0.334	0.079	4.24	0.000	1.08
Firm size	Size	0.017	0.007	2.44	0.015	1.12
Board independence	IND	−0.013	0.053	−0.25	0.804	1.04
Firm age	Age	0.051	0.034	1.50	0.134	2.67
Financial constraints	FC	0.078	0.017	4.58	0.000	1.05
Constant	C	−0.139	0.162	−0.86	0.391	—
F-statistic		11.04				
Prob. (F-statistic)		0.0000				
R-squared		0.1907				

To test this hypothesis, the estimation results of the model presented in *Table 10* were used. The results indicate that the p-value (or significance level) of the F-statistic is 0.0000. Since this value is below 0.05, the null hypothesis is rejected at the 95% confidence level, indicating that the model is statistically significant. The coefficient of determination (R^2) indicates that approximately 19% of the variation in the dependent variable is explained by the independent and control variables included in the model. The control variables of firm size and financial constraints have positive coefficients and significance levels below 5%; therefore, they have a positive and statistically significant relationship with the dependent variable. The VIF values are below 10, indicating the absence of multicollinearity.

Overall, the results show that the coefficient of the interaction term between institutional investors and industry-leading firms (Institutional investors × Industry-leading firms) is 0.334, with a significance level of 0.000, which is below the 5% threshold. The interaction effect is therefore statistically significant, indicating that, among industry-leading firms, institutional investors have a positive and significant effect on firms' capital structure. Accordingly, at the 95% confidence level, the second research hypothesis is supported.

8.7 | Results of Testing Hypothesis 3

Table 11. Results of testing hypothesis 3.

Dependent Variable: Firm Capital Structure						
Variable	Symbol	Estimated Coefficient	Standard Error	z-Statistic	p-value	Collinearity
Institutional investors	InstOwn	0.235	0.081	2.89	0.004	1.13
Industry-leading firms	Liad	0.026	0.035	0.76	0.448	2.93
IPO	IPO	−0.009	0.073	−0.13	0.899	1.09
Institutional investors × industry-leading firms	InstOwn × Liad	0.341	0.092	3.70	0.000	1.10
Institutional investors × IPO	InstOwn × IPO	0.033	0.097	0.35	0.728	2.30
Institutional investors × industry-leading firms × IPO	InstOwn × Liad × IPO	−0.053	0.043	−1.23	0.220	2.53
Firm size	Size	0.017	0.010	1.67	0.095	1.19
Board independence	IND	−0.010	0.060	−0.18	0.856	1.06
Firm age	Age	0.042	0.042	1.02	0.308	2.70
Financial constraints	FC	0.078	0.018	4.12	0.000	1.08
Constant	C	−0.120	0.226	−0.53	0.596	—
F-statistic		5.24				
Prob. (F-statistic)		0.0000				
R-squared		0.1945				

To test this hypothesis, the estimation results of the model presented in *Table 11* were used. The results indicate that the p-value (or significance level) of the F-statistic is 0.0000. Since this value is below 0.05, the null hypothesis is rejected at the 95% confidence level, indicating that the model is statistically significant. The coefficient of determination (R^2) indicates that approximately 19% of the variation in the dependent variable is explained by the independent and control variables included in the model. The control variable of financial constraints has a positive coefficient and a significance level below 5%; therefore, it has a positive and statistically significant relationship with the dependent variable. The VIF values are below 10, indicating the absence of multicollinearity. Overall, the results show that the coefficient of the three-way interaction term between institutional investors, industry-leading firms, and IPOs (Institutional investors $\times$ Industry-leading firms $\times$ IPO) is -0.053 , with a significance level of 0.220, which is above the 5% threshold. Therefore, the interaction effect is not statistically significant, indicating that, under IPO conditions, institutional investors do not have a statistically significant effect on the capital structure of industry-leading firms. Accordingly, at the 95% confidence level, the third research hypothesis is rejected.

9 | Conclusion

The results of testing the first hypothesis indicate that institutional investors have a significant effect on firms' capital structure. This finding suggests that firms' ownership structure and the presence of institutional investors can play an important role in financial decision-making. Institutional investors generally possess greater financial expertise, extensive information resources, and stronger analytical capabilities than individual investors. Accordingly, through effective monitoring of management, they can influence decisions concerning firms' capital structure. From the perspective of agency theory, the presence of institutional investors reduces conflicts of interest between managers and shareholders. By effectively monitoring managerial performance, institutional investors encourage managers to make more efficient financial decisions. Therefore, institutional ownership can contribute to the adoption of a more optimal capital structure and the reduction of agency costs. This finding is consistent with the results reported by Moradi et al. [24], Ahmadpour and Rasaeian [43]. These studies similarly demonstrate that institutional investors influence firms' capital structure decisions through their monitoring role.

The findings are also consistent with international studies, including those by Huo et al. [38] and Sharma et al. [35]. The results of testing the second hypothesis indicate that institutional investors have a significant effect on the capital structure of industry-leading firms. This finding suggests that institutional investors play a more prominent role in financial decision-making in firms holding leading positions within their industries. Industry-leading firms generally rank higher in terms of size, market share, sales volume, and competitive strength and, consequently, attract greater attention from institutional investors. The presence of institutional investors in these firms can increase monitoring of managerial performance and improve the quality of financial decisions. By carefully analyzing firms' financial conditions and evaluating investment opportunities, institutional investors can guide management toward selecting a more appropriate capital structure. This finding is consistent with Alipour et al. [34], who found that institutional investors play an important role in improving the capital structure of industry-leading firms. It is also consistent with Ahmadpour and Rasaeian [43], who showed that institutional ownership can influence financing decisions in large industrial firms.

International studies by Choi et al. [39] and Wang and Luo [42] likewise indicate that institutional investors have a significant influence on financial policies in large and industry-leading firms. The results of testing the third hypothesis indicate that the hypothesis is not supported. In other words, under IPO conditions, institutional investors do not have a statistically significant effect on the capital structure of industry-leading firms. This finding suggests that, although institutional investors remain important participants during the IPO process, their presence does not significantly alter the relationship between institutional ownership and the capital structure of industry-leading firms under IPO conditions. During the IPO process, substantial information asymmetry typically exists between firms and market investors. The presence of institutional investors can help reduce this information asymmetry and serve as a positive signal to other investors. Nevertheless, the insignificant three-way interaction effect observed in this study indicates that, specifically

among industry-leading firms, IPO conditions do not significantly strengthen or alter the effect of institutional investors on capital structure. This finding should be interpreted in light of the empirical evidence reported in the literature. While studies by Hafshejani et al. [32], Chung and Wang [26], and Sharma et al. [35] emphasize the role of institutional investors during IPOs, the present study does not find a statistically significant moderating effect of the IPO condition on the relationship between institutional investors and capital structure in industry-leading firms. Similarly, although international studies by Sharma et al. [35] highlight the importance of institutional investors in the IPO process and in shaping firms' capital structures, the findings of the present study suggest that this effect is not statistically significant when the joint effects of institutional ownership, Liad, and IPO status are considered. Overall, the findings of this study indicate that institutional investors constitute an important factor influencing firms' capital structure.

Their presence can contribute to the selection of a more appropriate capital structure through effective managerial monitoring, reduction of information asymmetry, and improvement in the quality of financial decisions. The results also demonstrate that the role of institutional investors in determining capital structure is more pronounced among industry-leading firms. This may be attributable to the greater economic significance of these firms and the increased attention they receive from institutional investors. In addition, the findings indicate that, although institutional investors continue to play an important role in firms' financial decision-making under IPO conditions, IPO status does not significantly moderate their effect on the capital structure of industry-leading firms.

Based on the findings of the present study, which demonstrate a significant effect of institutional investors on firms' capital structure, particularly among industry-leading firms and under IPO conditions, the following practical recommendations are proposed:

Given that the findings indicate that institutional investors also have a significant effect on capital structure under IPO conditions, firms planning to conduct an IPO are advised to attract reputable institutional investors in order to enhance market confidence. The presence of such investors can help reduce information asymmetry between the firm and market participants and provide the market with a positive signal regarding the firm's quality and future prospects. The Securities and Exchange Organization can facilitate more effective institutional investor participation by enhancing corporate information transparency, strengthening the corporate governance framework, and developing financial instruments. In addition, providing accurate and comprehensive information on firms' ownership structures can enable investors to make more informed decisions. Financial analysts and capital market participants are advised to consider ownership structure and the extent of institutional investor participation as important indicators when evaluating firms' financial conditions, capital structures, and financing decisions. Such consideration can contribute to improving the accuracy of financial analyses and forecasts in the capital market.

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